UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,184	07/01/2005	Akihiko Namba	039.0050	4938

29453 7590 12/23/2008

Judge Patent Associates
Dojima Building, 5th Floor
6-8 Nishitemma 2-Chome, Kita-ku
Osaka-Shi, 530-0047
JAPAN

EXAMINER	
SINGAL, ANKUSH K	
ART UNIT	PAPER NUMBER
2895	

MAIL DATE	DELIVERY MODE
12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,184	NAMBA ET AL.	
	Examiner	Art Unit	
	ANKUSH k. SINGAL	2895	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2 and 6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/29/2008 has been entered.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over A.M.Zaitsev(Optical properties of Diamond- A data Handbook 2001) .

Re. claim 2, Zaitsev discloses a method of manufacturing n-type semiconductor diamond, the method employing an ion-implantation apparatus having an electron – beam line and Li and N ion-beam lines, and the method comprising: implanting Li and N ions into the diamond and annealing but does not teach a preparatory step of providing single-crystal type IIa or undoped epitaxial diamond essentially containing impurities; an implantation step of irradiating the diamond with the Li and N ion-beams lines simultaneously and in such a manner as to implant the diamond Li ions at a dose

of at least 3.0.times.10.sup.15 cm .sup.-2 and the Li and N sub-total dose is 7.0.times.10.sup.15 cm .sup.-2 , and so that the implantation depths at which the post-implantation Li and N concentrations each are at least 1600ppm will overlap; an irradiation step, concurrent with said implantation step, of irradiating the diamond with the electron beam to cause the implantation Li and N ions to distribute in locations within the diamond in which Li-N pairing is likely to occur; and a step of annealing at a temperature in range of from 800.degree. C. to less than 1800.degree. C, under high – pressure conditions of at least 3 GPa so as to cause Li and N pairing to occur to the exclusion of Li associating with implantation –caused vacancies in the diamond, such that the Li-N pairs do not associate with vacancies but instead become electrically activated shallow donors; whereby said diamond has a sheet resistance of not greater than 1.4.times.10.sup.4.OMEGA./.quadrature. Zaistev also teaches the annealing behavior of the H3 center strongly depends on the type diamond and irradiation conditions. However Zaitsev disclosure for given conditions of the claimed invention, the claim range is considered to be an obvious matter of finding an optimum workable range for some chosen design requirement utilizing Zaitsev method.

Note that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves routine skill in the art. In re Aller, 105 USPQ 233.

Any difference in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co.,800 F.2d 1091,231 USPQ 375 (Fed. Cir. 1986)

Re. claim 6, Zaitsev discloses the Semiconductor diamond manufactured by the n-type semiconductor-diamond manufacturing method set forth in claim 2.

Response to Applicant's Argument's

In response to applicant's arguments , Page 6,lines 13-17 " Zaistev does not teach the methods of the present invention bring about Li and N pairing , such that the Li-N pairs do not associate with vacancies but instead become electrically activated shallow donors….", it is known in the art of co-implantation that when two ions are implanted together they leave no crystal defects, so the implantation of Li and N in Zaistev teaches the limitation of Li and N pairing, such that the Li-N pairs do not associate with vacancies but instead become electrically activated shallow donors.

In response to applicant's argument "… It is respectfully asserted that the observation in Zaistev is merely a call to experimentation, by no means is this quoted observation a disclosure…", it is clear from the Zaistev that the annealing behavior strongly depends on the type of diamond and irradiation conditions and even though Zaistev reference is considered as a observation by the applicant , there is no argument by the applicant which can show that the diamond used by the applicant differs from the one used by Zaistev which makes the examiner think that the applicant agrees with the rejection to the claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANKUSH k. SINGAL whose telephone number is (571)270-1204. The examiner can normally be reached on monday-friday 7am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards can be reached on (571)272-1736. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Fernando L. Toledo/
Primary Examiner, Art Unit 2895

/Ankush k Singal/
Examiner, Art Unit 2895